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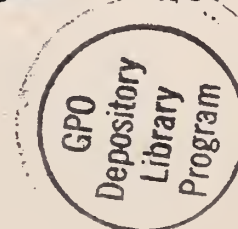
BEAR-RESISTANT CONTAINERS

MINIMUM DESIGN AND STRUCTURAL STANDARDS
INSPECTION AND TESTING METHODOLOGY



INTERAGENCY GRIZZLY BEAR COMMITTEE
1989

05 JUL 1990



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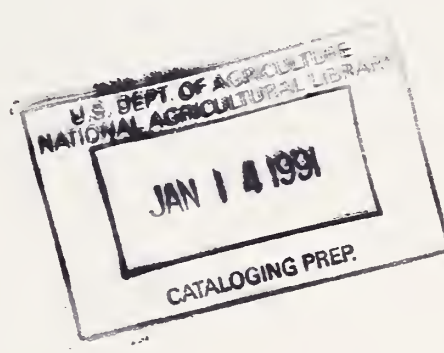


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BEAR-RESISTANT CONTAINERS

MINIMUM DESIGN AND STRUCTURAL STANDARDS INSPECTION AND TESTING METHODOLOGY

1989



Interagency Grizzly Bear Committee





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ACKNOWLEDGMENTS

The Interagency Grizzly Bear Committee acknowledges the Yellowstone Ecosystem National Forests and the USDA Forest Service's (USFS) Missoula Technical Development Center (MTDC) for their help in compiling information and developing test methodology for bear-resistant containers. Special recognition is given to Doug Seus and "Bart," his trained grizzly bear, John Weaver, former USFS National Grizzly Bear Habitat Coordinator, and Dick Karsky, MTDC Engineer, for their assistance in testing containers.

Thanks go to outfitters Bill Akers and Harold Turner for providing containers for testing.

Thanks also go to Steve Mealey, USFS, Dick Knight, National Park Service, and Dick Johnson, Montana Department of Fish, Wildlife and Parks, original task force members; Rodd Richardson, USFS National Grizzly Bear Habitat Coordinator; Bill Ruediger, Northern Region-USFS; Gary Carver and Dave Henry, Shoshone National Forest; John Baglien, Bridger-Teton National Forest; Rich Inman and Dan Tyers, Gallatin National Forest; and Jay Gore, U.S. Fish and Wildlife Service for review of this document, information on bear-resistant containers, and technical advice on storage of attractants in grizzly bear country.

Special thanks to USFS Engineering, Geometronics, and Office of Public Affairs, Ogden, Utah, for layout and technical advice in producing this document.

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Mike Rath
Task Force Leader
USDA Forest Service
Ogden, Utah



FOREWORD

The Interagency Grizzly Bear Committee (IGBC) is made up of top officials from the USDA Forest Service, National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, State Wildlife Agencies for Montana, Wyoming, Idaho, and Washington, and Canadian Wildlife Officials.

The IGBC works to assure recovery of viable grizzly bear populations and their habitats in areas of the western United States through interagency coordination of policy, management, and research.

To help clarify minimum standards for bear-resistant containers and achieve more consistency in the use of containers, the IGBC assigned a task force to develop a methodology for defining, testing, and recommending minimum design and structural standards for bear-resistant containers.

All visitors in grizzly bear country must properly store any attractant in either a bear-resistant container or a closed vehicle. Hanging attractant from a tree or pole or placing it on a platform are also approved storage methods. Those visitors planning to use containers are encouraged to have them inspected prior to back-country travel. This will ensure that the container(s) meet minimum bear-resistant design/structural standards. It will also facilitate sanitation requirements and reduce potential for human/bear encounters.

Courtesy inspections of containers are available at USDA Forest Service and National Park Service stations in the Yellowstone area. If further testing is necessary, container owners will be referred to a test location.

This effort was primarily developed to address sanitation needs in the Yellowstone area, but is applicable to all grizzly bear habitat.

Dale Strickland
Chairman, IGBC

INTRODUCTION

Proper storage of food, garbage, and other attractants in designated grizzly bear habitat is required by the USDA Forest Service (USFS) and the National Park Service (NPS) under the authority of 36 CFR 261.50 (a) and (b) and 36 CFR 2.10(d). This requirement has a primary goal of minimizing human/grizzly bear encounters and thereby providing for visitor safety and protection of this magnificent species. According to the requirement, visitors to grizzly bear habitat are prohibited from possessing or leaving unattended any attractant that is not either properly stored or being eaten, prepared for eating, or transported.

Proper storage of attractants has been hindered by a lack of information on what constitutes a bear-resistant container. As a result rangers and other back-country patrol personnel are encountering the use of containers of questionable strength and design.

With the assistance of field personnel from National Forests in the Yellowstone Ecosystem, a variety of containers were examined to identify examples of bear-resistant designs. Testing of container strength was conducted using "Bart," a trained grizzly bear, owned by Doug Seus. These tests were determined to be of limited value because "Bart" was not allowed to chew or claw, as a wild bear would, for fear he may injure himself. Therefore, Bart's effort consisted primarily of a stress or compaction test.

To better structure a test methodology, the USFS Missoula Technical Development Center (MTDC) was contacted to help design a test for container strength. The engineers at MTDC developed an impact-testing machine that closely simulates the pressure a bear can exert on a container.

This handbook displays the minimum design and structural standards and courtesy inspection and testing methodology for bear-resistant containers. Examples of a variety of bear-resistant containers and their designs are also included.



WHY IS PROPER STORAGE OF ATTRACTANTS NECESSARY?

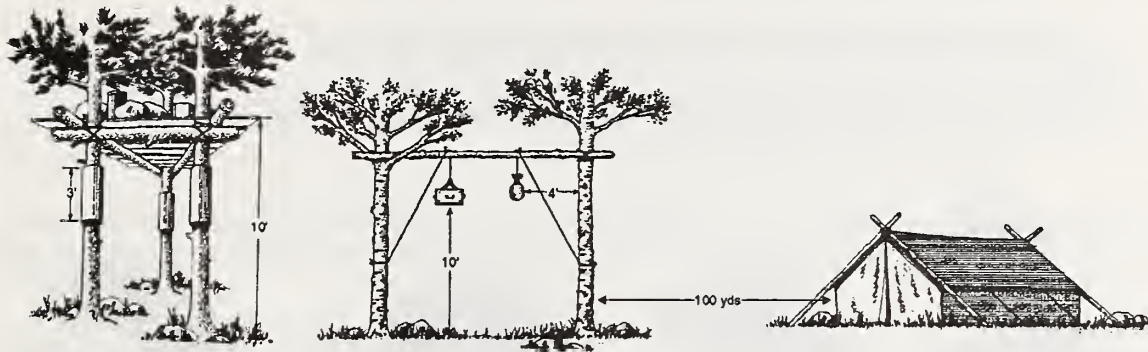
Improper storage of attractants encourages bears to frequent campsites looking for food. This increases the opportunity for human/bear encounters and the potential for injury to either humans or the bear. Bears that become conditioned to visiting campsites usually must be destroyed.



Campsite where bear gained access to attractants.



APPROVED METHODS FOR STORING ATTRACTANTS IN GRIZZLY BEAR COUNTRY



1. Hang attractant (at least 10 feet above ground and 4 feet out from the tree trunk) or store on platform out of reach of bears. Platforms are only effective if their supports are wrapped with metal stovepipe to prevent cubs from climbing and obtaining food.
2. Place attractant in a "bear-resistant" container.



Key elements to bear-resistancy are strength and design.



PRINCIPAL WAYS BEARS OPEN CONTAINERS

1. Bears carefully search a container for any cracks or openings they can get their claws or teeth into and then rip or pry open the container.
2. Bears claw or chew on the container until the material gives way.
3. Bears bat or pounce on the container until the structural integrity of the material fails.



Some containers fail to prevent bear access.



DEFINITION OF A BEAR-RESISTANT CONTAINER

A bear-resistant container is a securable container constructed of a solid nonpliable material capable of withstanding 200 foot-pounds of energy (using the approved bear-resistant container impact-testing machine). When secured and under stress, the container will not have any cracks, openings, or hinges that would allow a bear to gain entry by biting or pulling with its claws. Wood containers are not considered bear-resistant unless they are reinforced with metal.

Sealed containers that reduce odors and leaking of attractants are recommended. However, this type of container is difficult to obtain and is not required for the container to be considered bear-resistant.



COURTESY INSPECTION OF CONTAINERS AND TESTING METHODOLOGY

To better serve the public and ensure that containers being used in grizzly bear habitat meet minimum bear-resistant design and strength requirements, courtesy inspections of containers are available at USFS and NPS Ranger Stations.

USFS and NPS personnel will issue to the owner a written certificate describing the container and stating that it is considered bear-resistant (Fig. 1). They will also issue courtesy inspection decals for owners to place on their containers.

If during the examination, a container appears to be unacceptable by definition and the owner insists the container is bear-resistant, the owner will be referred to a testing location.

Most containers will not need to be tested, because they will either clearly meet or fail minimum design and strength criteria during the courtesy examination.

If actual testing is conducted, it will be done using the approved impact-testing machine.* The test will involve dropping, one time, the 100-pound-weighted carriage raised 2 feet (200 foot-pounds) above the weakest side of the container. Any damage to the container that would allow a bear access to its contents would disqualify the container.

If a container is actually tested, owners will be required to sign a waiver exempting the tester of liability should the container be damaged in the testing process.

*(See Appendix B for photos and design illustrations.)



Figure 1. Inspection Decal Example



IGBC BEAR-RESISTANT CONTAINER INSPECTION FORM

This container has been inspected and meets minimum bear-resistant design and structural standards. This is not a guarantee that a grizzly bear cannot gain entry into the container. Visitors to grizzly country are reminded that the safest method of storing attractant is to place it out of the reach of bears.

Container Description

Courtesy Decal Number _____

Issued to _____

Inspected by _____

Date _____

Agency/Location _____

- Instructions:
- Place courtesy inspection decal on container.
 - Record decal number on inspection form.
 - Provide duplicate of form to container owner.
 - Maintain original inspection form on file at inspecting unit..

Interagency Grizzly Bear Committee

Figure 2. Inspection Form Example

EXAMPLES OF BEAR-RESISTANT CONTAINERS

On the following pages are examples of containers that meet the design and structural standards to be considered bear-resistant and are currently used in the Yellowstone Ecosystem. Detail drawings for several types of containers are also included.

These are examples only. Other designs meet the definition for bear-resistant containers. Lighter, more creative designs will undoubtedly be developed in the future.

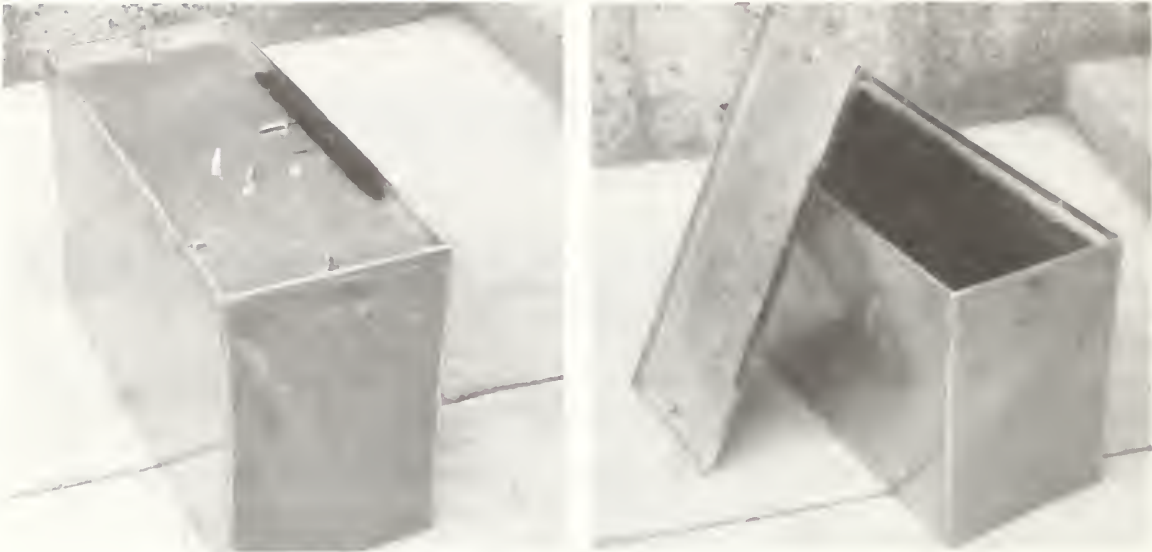
Bear-resistant containers are available from a number of commercial firms. Firm names are not listed in this publication. The public may obtain information on known suppliers of bear-resistant containers from local USFS and NPS offices.



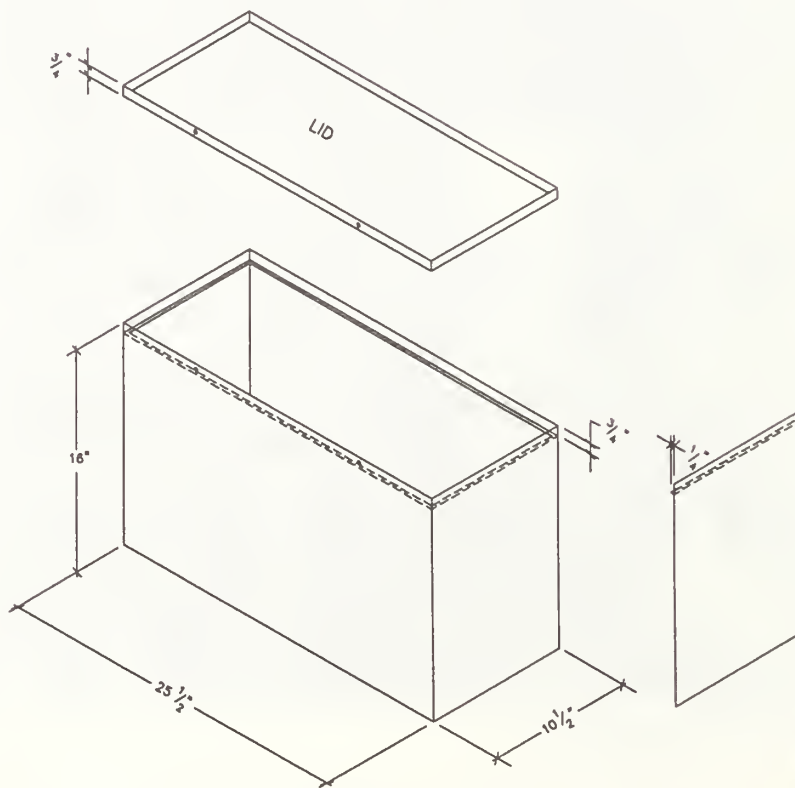
Bear-resistant containers are also functional.



WELDED ALUMINUM PANNIER



Recessed lid held in place with machine bolts.



WELDED ALUMINUM COOLER PANNIER



Cooler pannier has insulation between double walls.



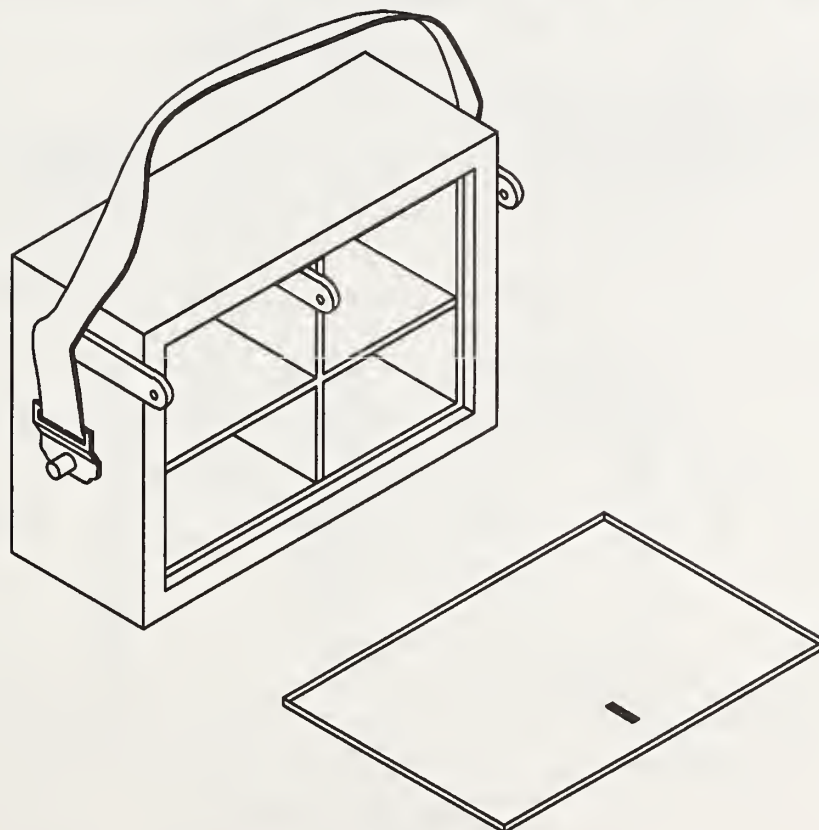
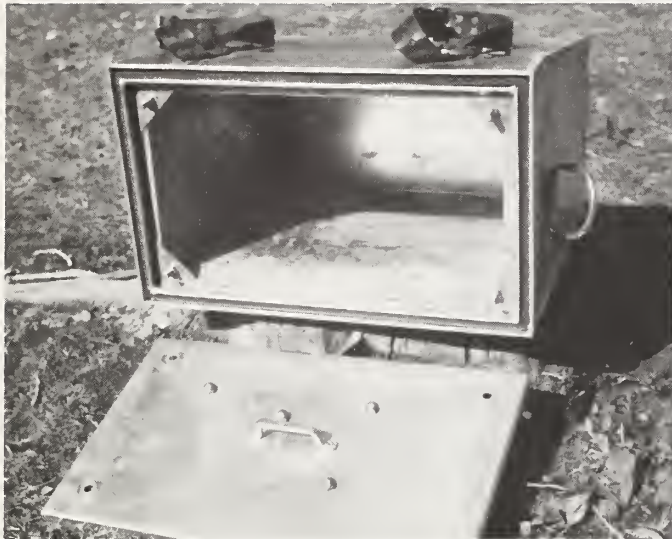
WELDED ALUMINUM KITCHEN PANNIER



Door has large steel piano hinge connecting with steel pop rivets and is secured with two key locks. Brackets on the side of each pannier accommodate legs for setup as a kitchen.



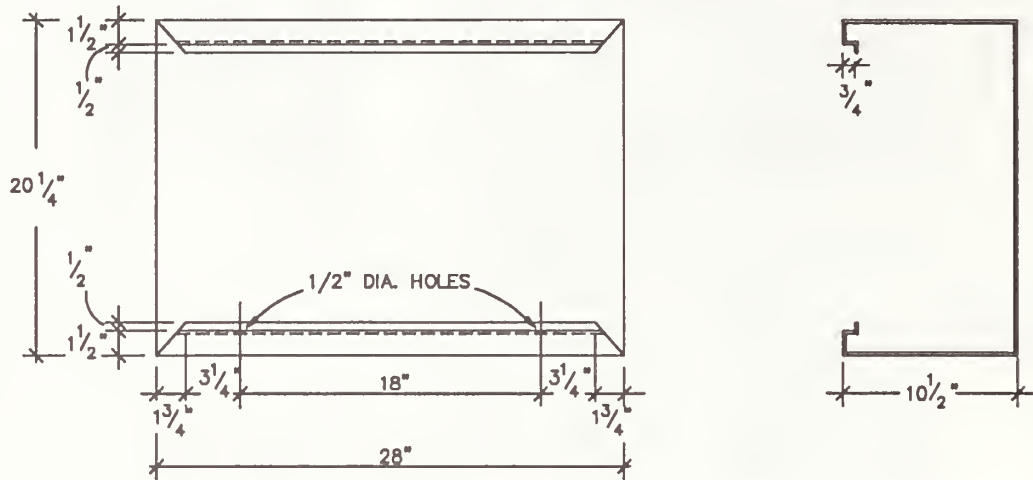
WELDED ALUMINUM KITCHEN PANNIER



Details of the above containers are shown on pages 14 and 15.



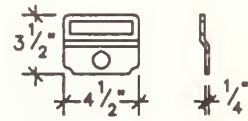
PANNIER BOX



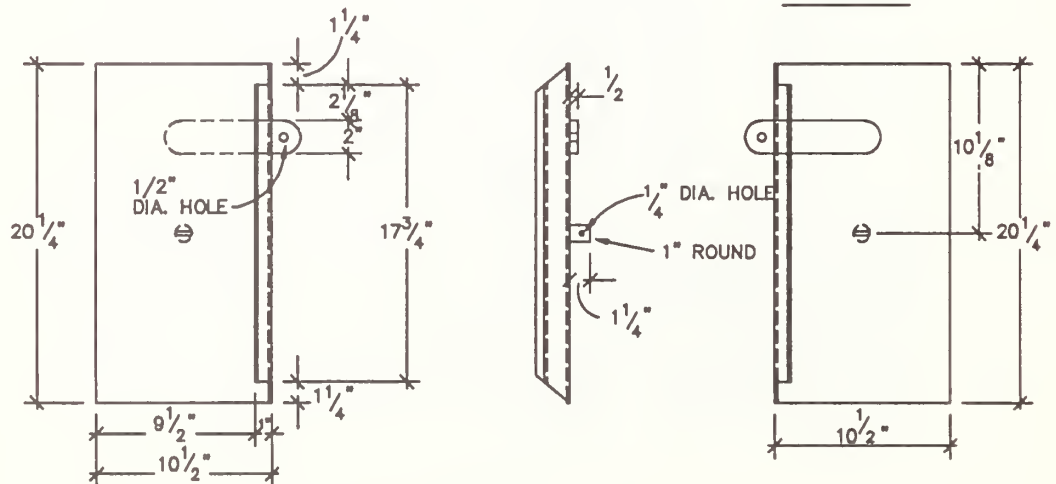
TOP/BOTTOM/BACK

NOTE:

MINIMUM GRADE OF ALUMINIUM TO BE USED SHALL BE 3/16".

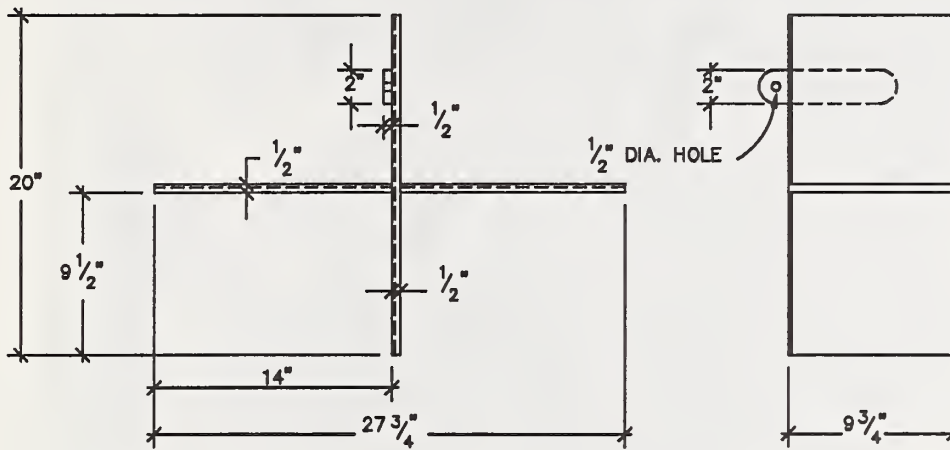


STRAP CLIP

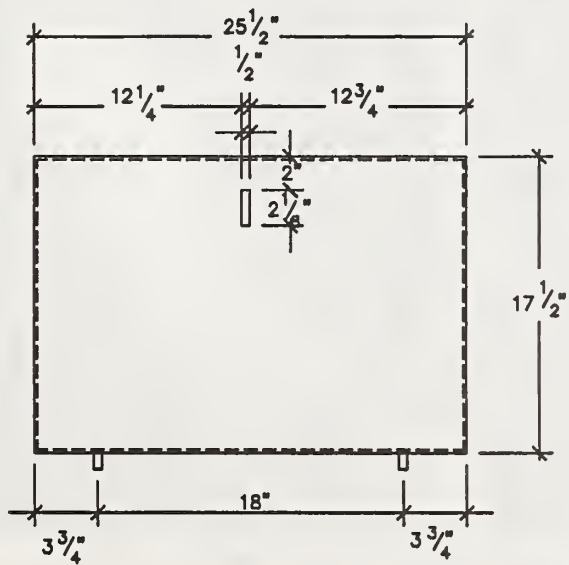
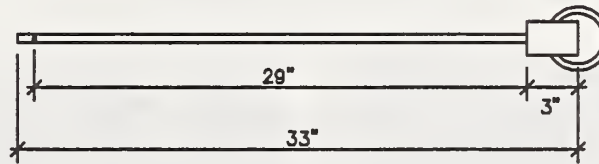


TYPICAL SIDE PANNEL

PANNIER BOX



SHELVES



DOOR

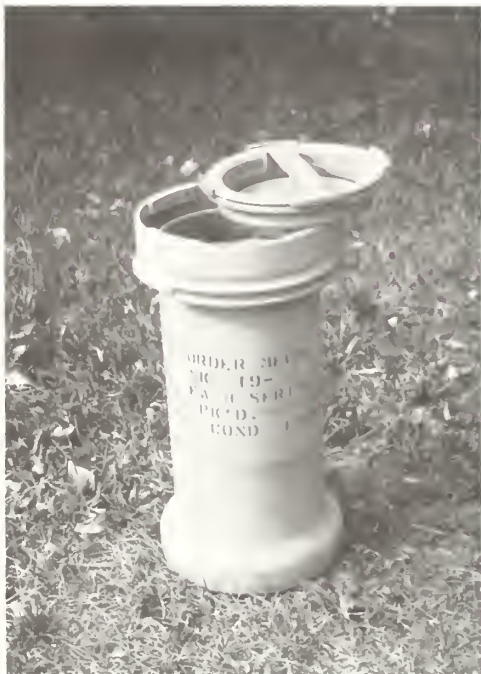


STEEL PANNIER



To reduce weight, this steel pannier was made from lighter gauge material and an interior baffle was inserted to prevent crushing.

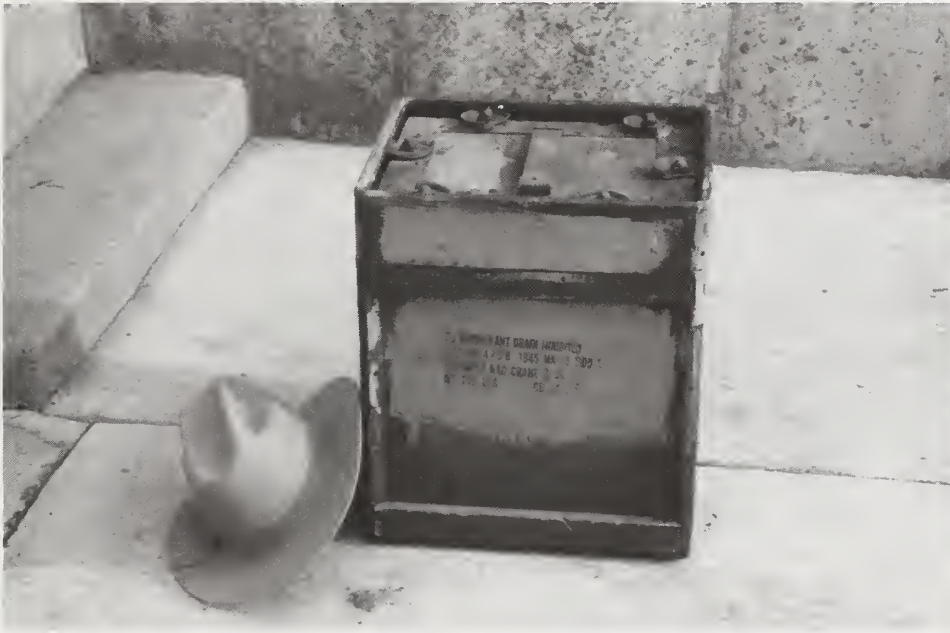
PVC PLASTIC TUBE



A number of designs made from PVC plastic are considered bear-resistant. Container diameter should be large enough to inhibit the ability of a bear to crush it with its mouth.



MILITARY SURPLUS CONTAINER



Container and lid are made of riveted plywood with stainless steel liner. The lid has six locking lugs and it sits on a rubber gasket creating a water-tight seal. A metal strap also encases the top of the box. Box size: 19"x14"x16" Wt.: 30 lbs.



MILITARY SURPLUS CONTAINER



Lid must be modified so it can be locked down.



**US GI
20mm
CANS**

Constructed of heavy gauge steel to U.S. Government specs, they feature a steel top with rubber water tight seal. Can lid hinges from either end or removes completely. Condition: Excellent (like new!). Measures: 8" W x 15" H x 18" L. Weight: 20 lbs. Holds approximately 2000 rds of .223 or over 1000 rds of .30 cal. Once you've used these big beauties for storage or whatever — you'll want more and more of them. Cans have all original O.D. paint and are practically un-used. We'll ship your order for ammo, accessories, etc. in or with a can.

Typical Advertisement



MILITARY SURPLUS CONTAINER



Latches need to be modified so a bear cannot flip them open.



55 GALLON DRUMS



Lid with locking ring.



Lid constructed of 1/8" steel with 2" lip. Lid is hinged and secured with hasps.



This container can be used above and/or below ground. Below ground units are installed leaving about 4" of the top of the barrel exposed. This method gets the barrel out of the way and also helps keep the contents from freezing.



WELDED STEEL BOX



Details of above container are shown on pages 23 thru 26.



NON-WELDED STEEL BOX



This steel box is similar in design to the previous welded steel box except it is secured with bolts and can be disassembled for packing.



DESIGN FOR WELDED AND NON-WELDED STEEL BOXES

BEAR-RESISTANT BOX

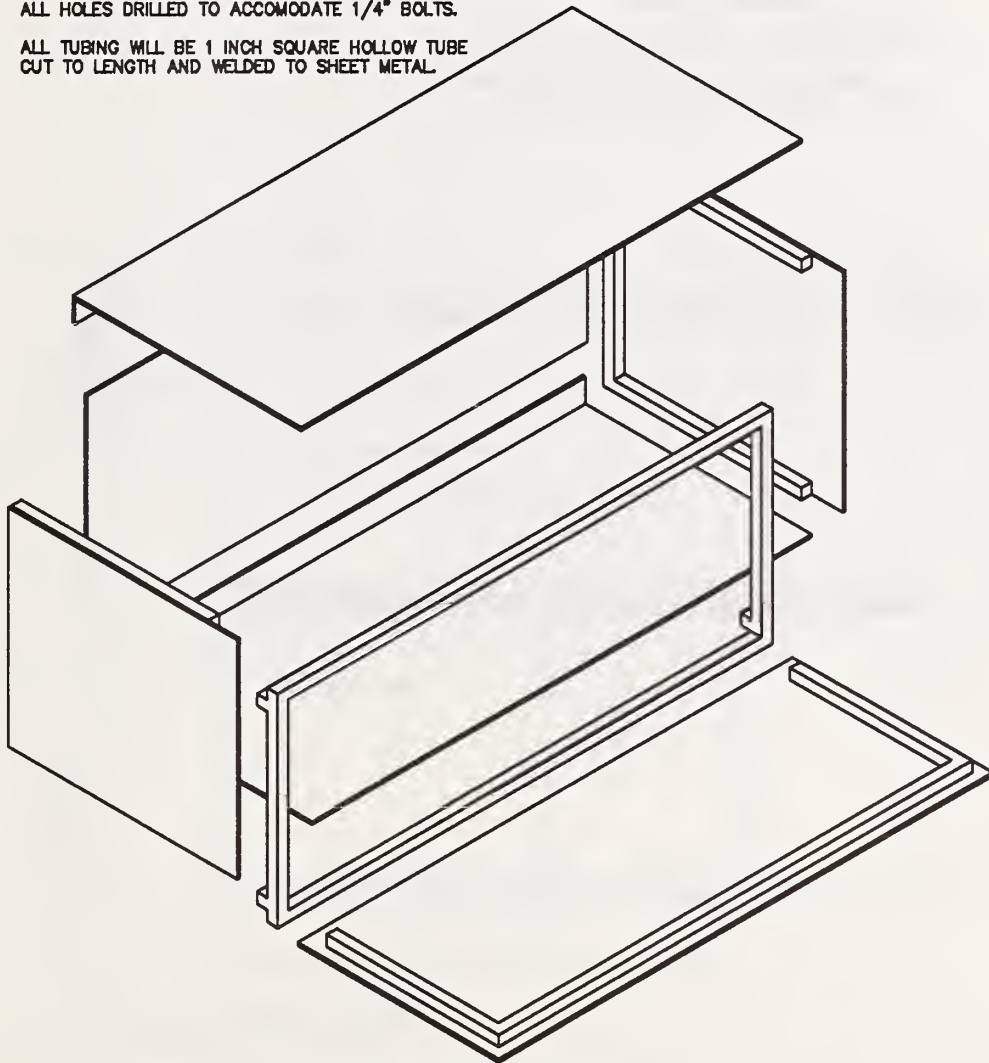
NOTES:

EDGES OF SHEET METAL SHALL BE EITHER ROLLED OR POLISHED TO A SMOOTH SURFACE TO PREVENT SHARP EDGES.

ALL WALL THICKNESS - 12 GAUGE.

ALL HOLES DRILLED TO ACCOMMODATE 1/4" BOLTS.

ALL TUBING WILL BE 1 INCH SQUARE HOLLOW TUBE CUT TO LENGTH AND WELDED TO SHEET METAL.



EXPLODED VIEW

BEAR-RESISTANT BOX

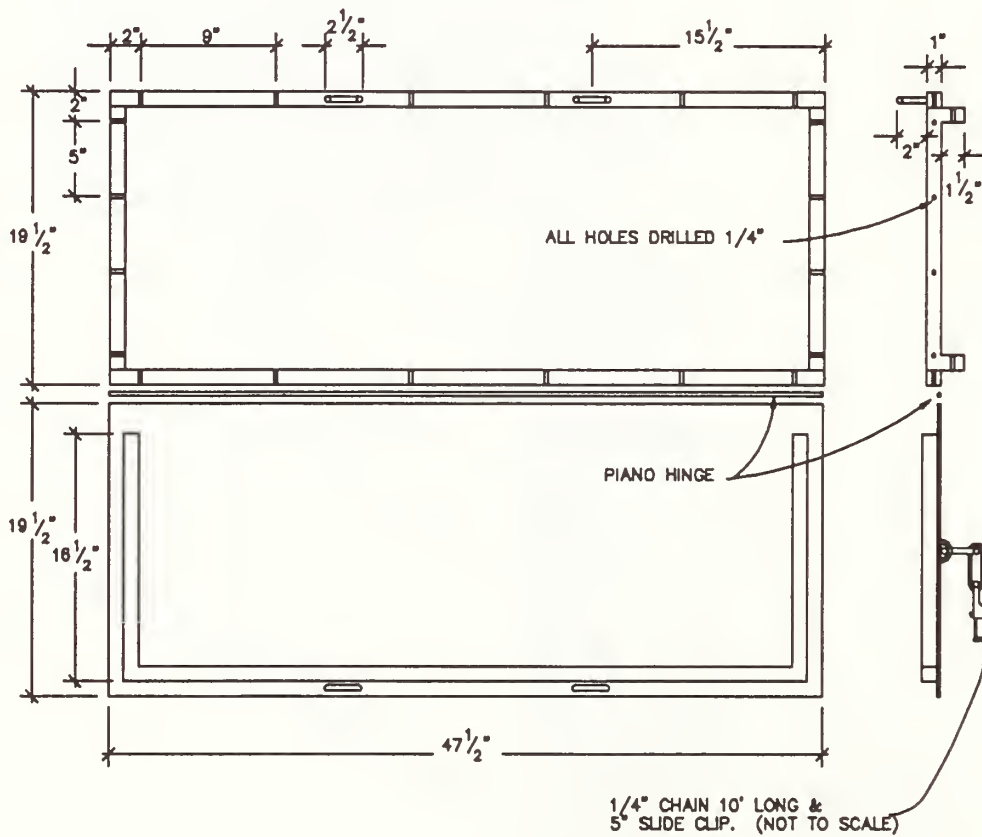
NOTES:

EDGES OF SHEET METAL SHALL BE EITHER ROLLED OR POLISHED TO A SMOOTH SURFACE TO PREVENT SHARP EDGES.

ALL WALL THICKNESS - 12 GAUGE.

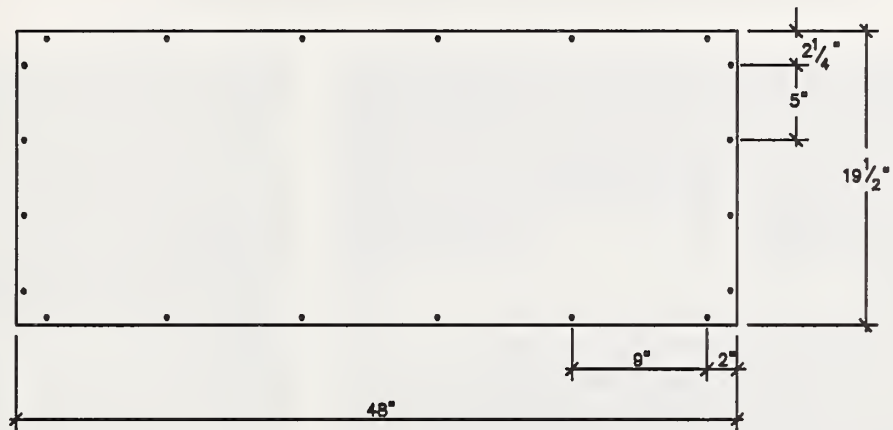
ALL HOLES DRILLED TO ACCOMMODATE 1/4" BOLTS.

ALL TUBING WILL BE 1 INCH SQUARE HOLLOW TUBE CUT TO LENGTH AND WELDED TO SHEET METAL.

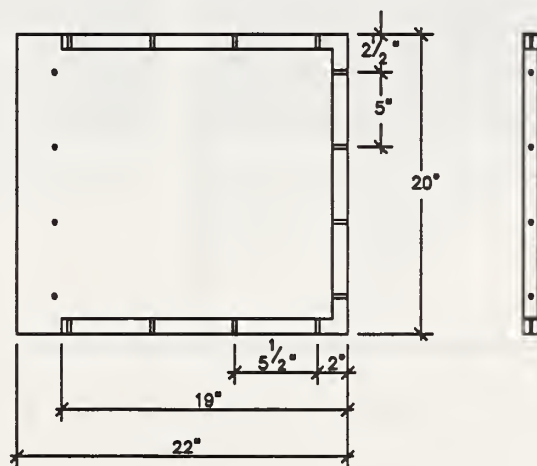


DOOR AND FRAME ASSEMBLY

BEAR-RESISTANT BOX

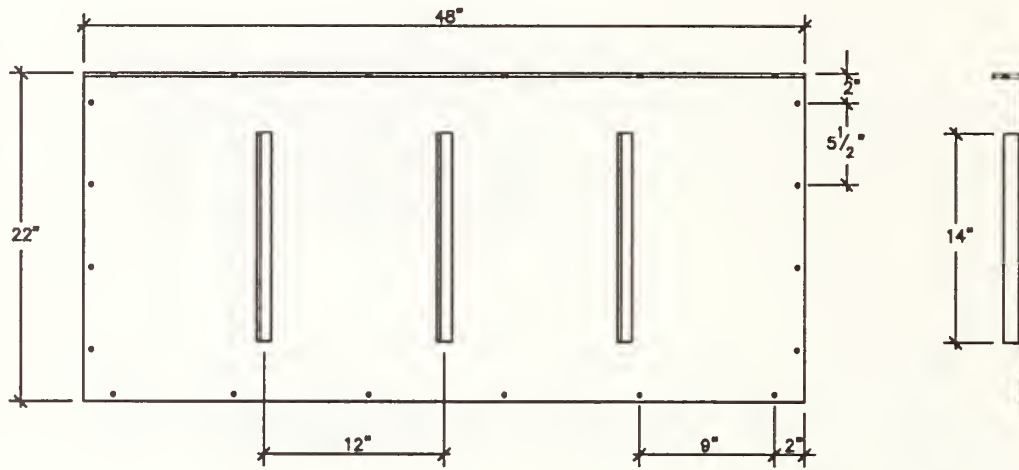


BACK PLATE

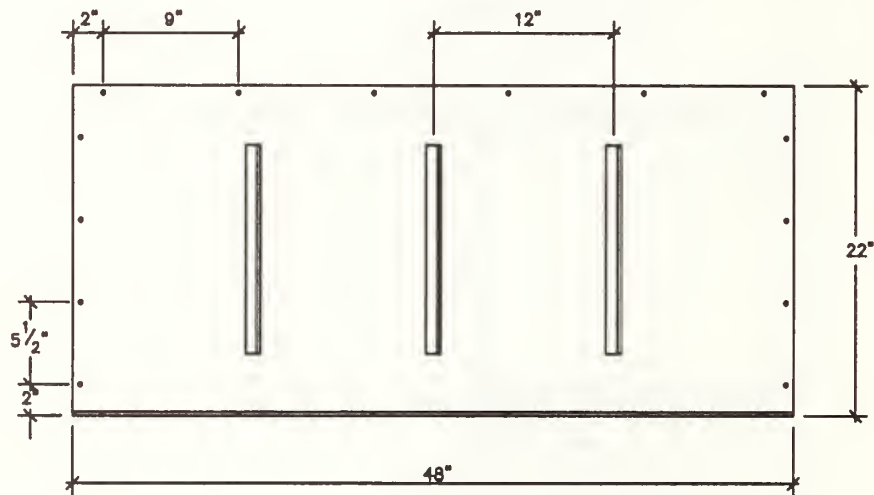


TYPICAL SIDE ASSEMBLY

BEAR-RESISTANT BOX



BOTTOM PLATE



TOP PLATE

IMPACT-TESTING MACHINE



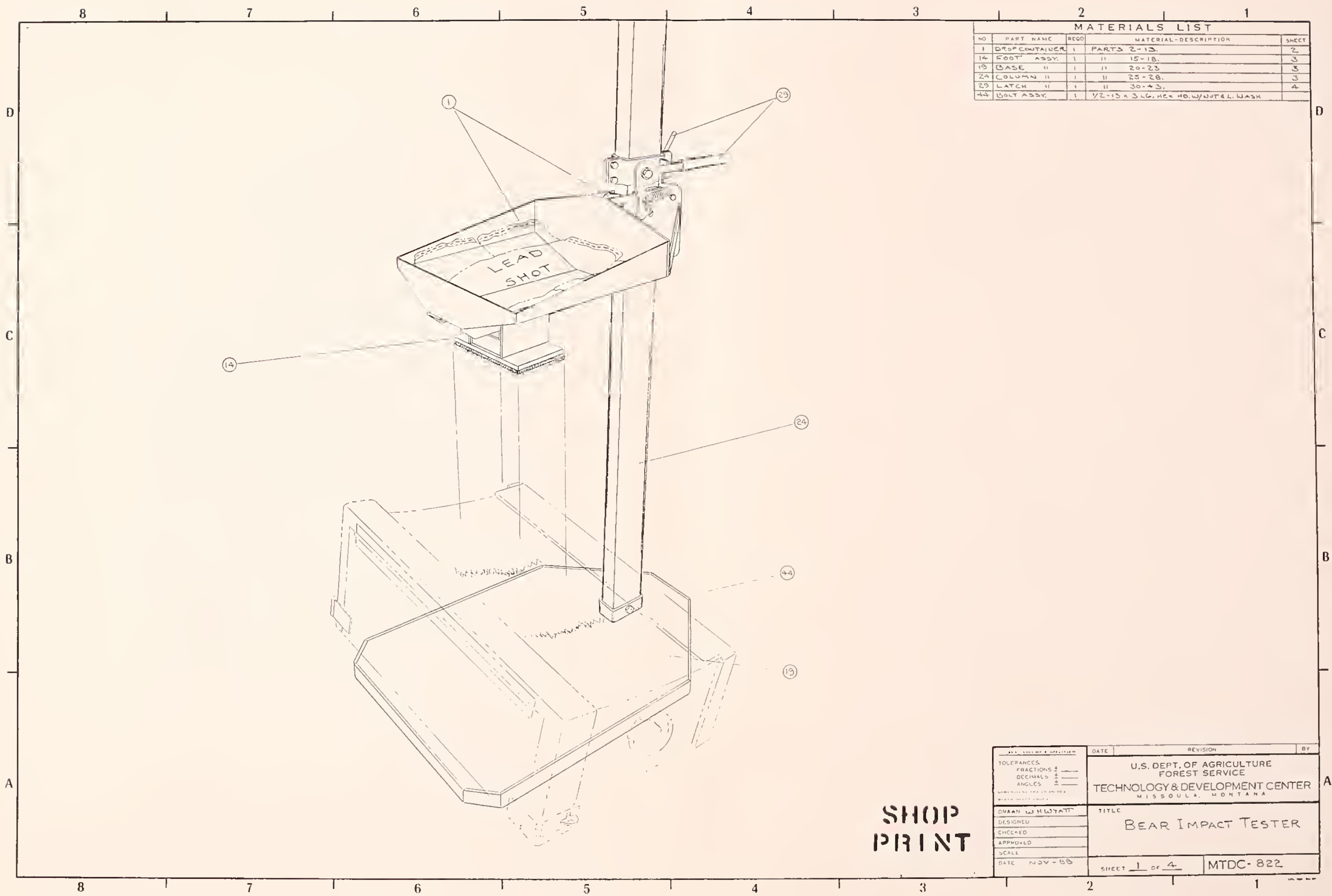
Impact Tester (drop height is adjustable to accommodate any size container).



Impact tester's striking pad is cushioned with two 3/8" pads and is 5"x10" in size to represent the approximate pad size of a bear's front feet.

Details of the Impact Tester are shown on pages 28 thru 36.



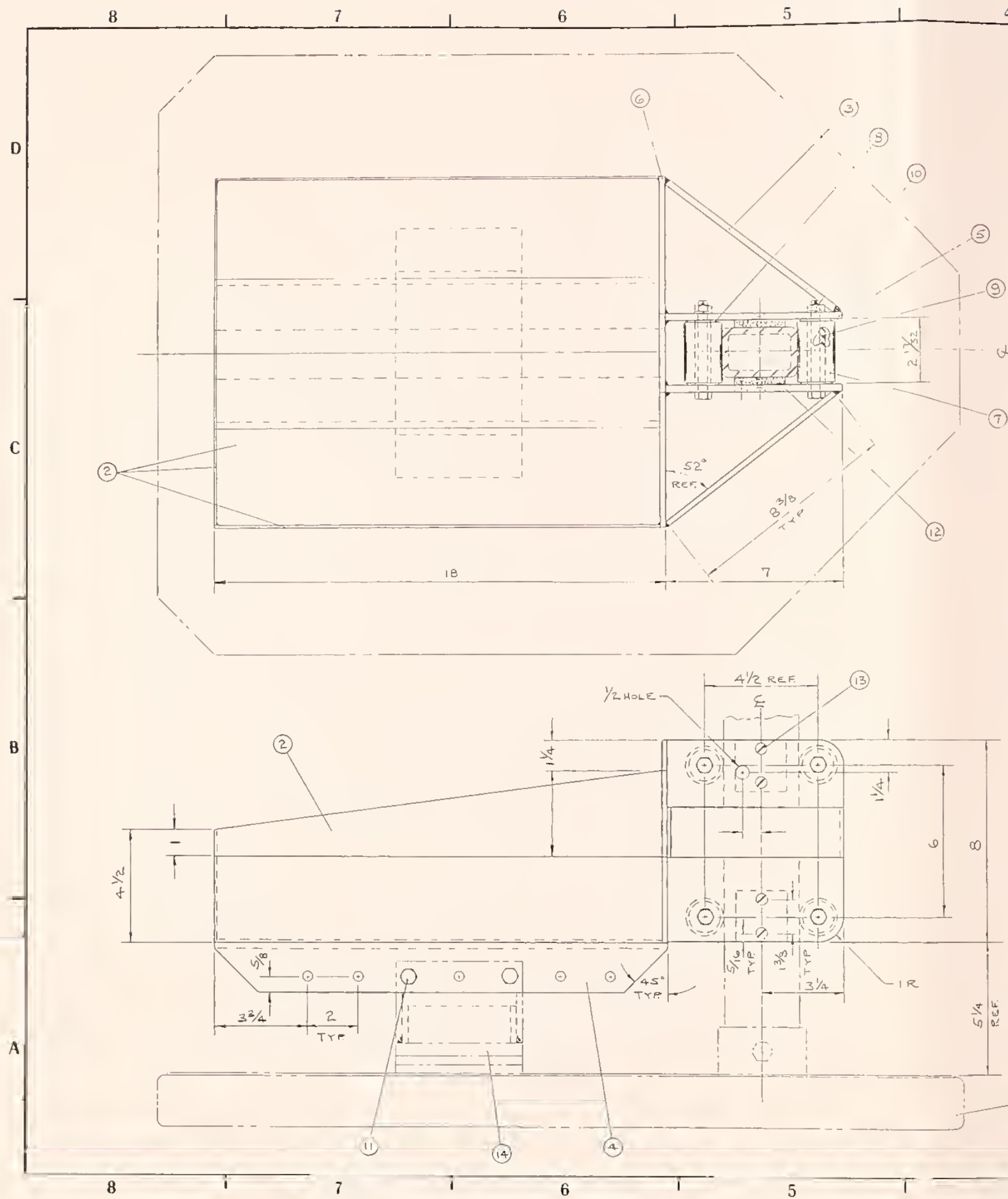


MATERIALS LIST				
NO	PART NAME	QTY	MATERIAL-DESCRIPTION	SHEET
1	DROP CONTAINER	1	PARTS 2-13.	2
14	FOOT ASSY.	1	" 15-18.	3
19	BASE	1	" 20-23.	3
24	COLUMN	1	" 25-28.	3
29	LATCH	1	" 30-43.	4
44	BOLT ASSY.	1	1/2-13 X 3 LG. HEX HD. W/ NUT & L. WASH.	

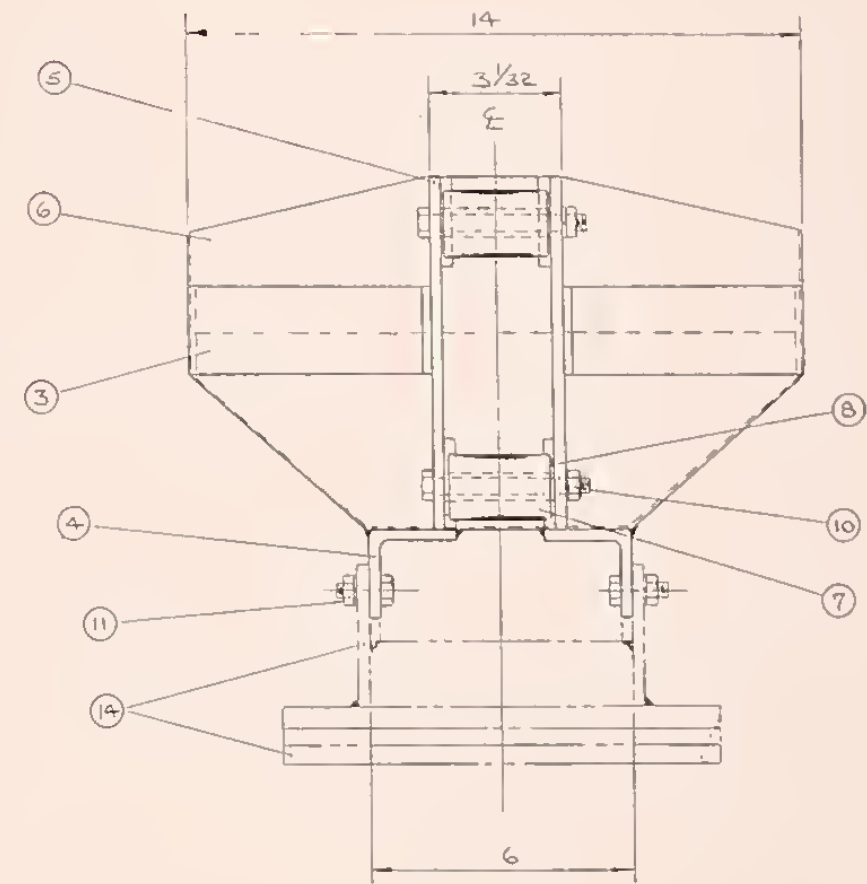
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TOLERANCES: FRACTIONS $\frac{1}{16}$ DECIMALS $\frac{1}{10}$ ANGLES $\frac{1}{2}$		U.S. DEPT. OF AGRICULTURE FOREST SERVICE TECHNOLOGY & DEVELOPMENT CENTER MISSOULA, MONTANA	
DESIGNED CHECKED APPROVED SCALE DATE NOV-68		TITLE BEAR IMPACT TESTER	
SHEET 1 OF 4		MTDC-822	





MATERIALS LIST				
NO.	PART NAME	QTY	MATERIAL-DESCRIPTION	SHEET
1	DROP CONTAINER	1	PARTS 2-13.	
2	PAN	1	11 GA. SHEET, STEEL	
3	GRACE	2	1/4 x 2 PLAT CAR, STEEL.	
4	BOTTOM CRKT.	2	2 x 2 1/2 ANGLE, STEEL.	
5	SIDE "	2	1/4 PLATE, STEEL.	
6	BACK PLATE	1	" " " "	
7	ROLLER	4	5/8 I.D. x 1 1/2 O.D. x 2 3/8 LG. NYLON.	
8	THRUST WASH	8	MCMASTER-CARR # 37064 A110 MACHINE	
9	BUSHING	4	BUSHING, 5/8 I.D. x 1 1/4 O.D. x 1 1/4 LG., STL	
10	BOLT ASSY.	4	5/8-16 x 3 1/4 LG. HEX HD W/ NUT & LOCK	
11	"	4	5/8-16 x 1 1/2 LG. HEX HD W/ NUT & LOCK	
12	WEAR PAD	4	1/4 THK x 2 3/4 UHMW SHEET.	
13	FLAT HD SCREW	8	#10-24 x 1/2 LG., BRASS	
14	FOOT ASSY	1	PARTS 15-18.	3

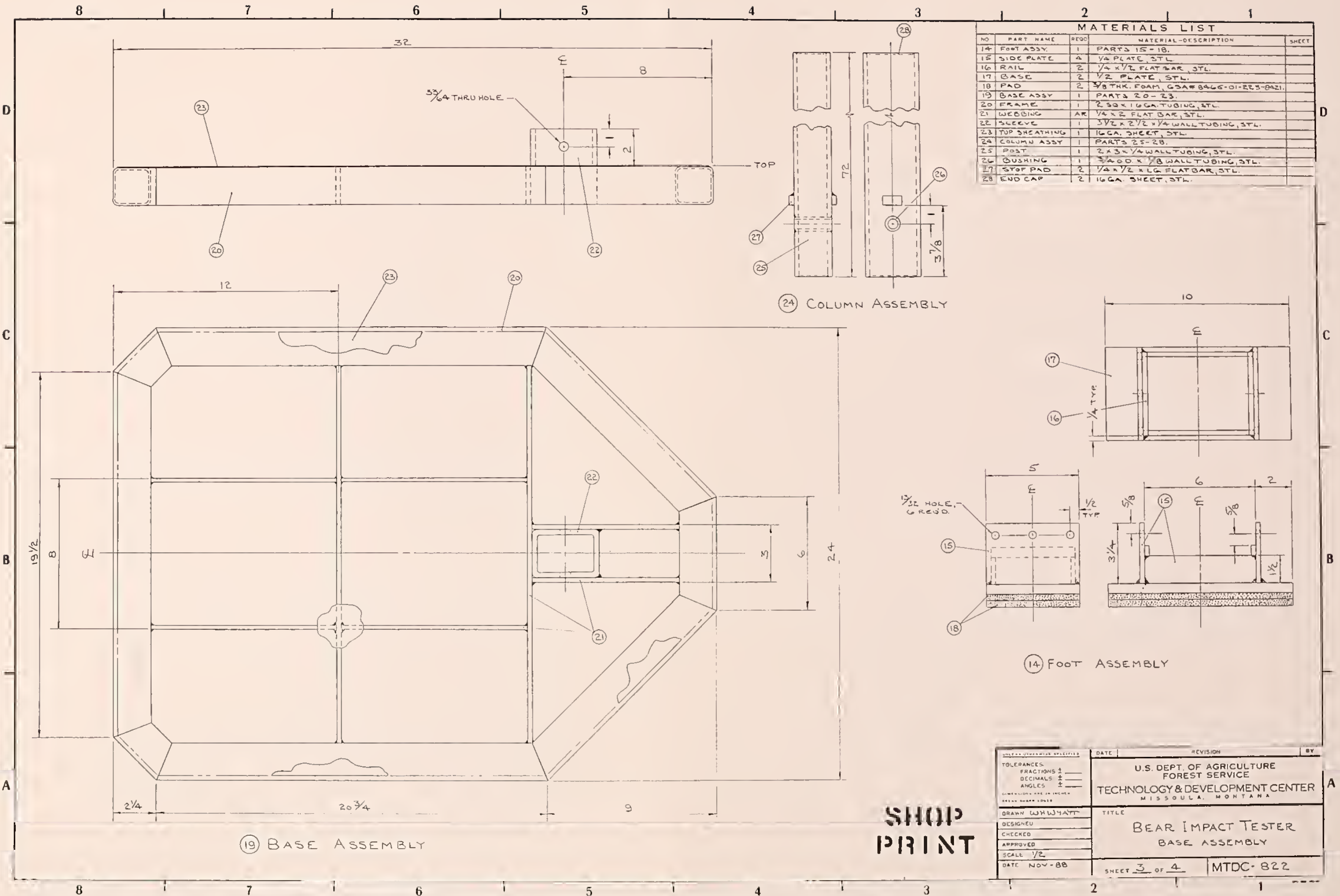


① DROP CONTAINER

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DRAWN W. H. WYATT		U.S. DEPT. OF AGRICULTURE FOREST SERVICE TECHNOLOGY & DEVELOPMENT CENTER MISSOULA, MONTANA					
DESIGNED		TITLE BEAR IMPACT TESTER DROP CONTAINER					
CHECKED		SCALE 1/2"					
APPROVED		DATE NOV-88					
SHEET 2 OF 4		MTDC-822					





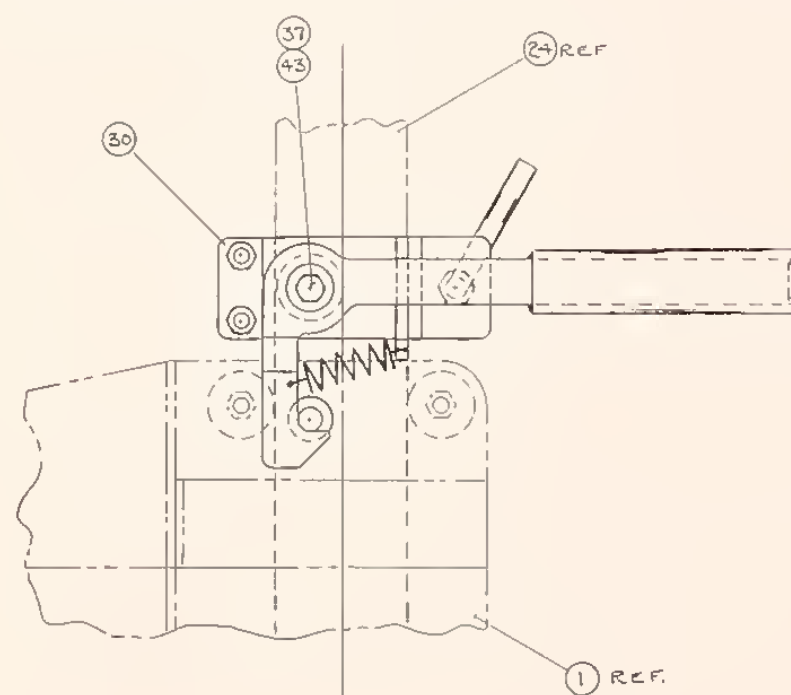
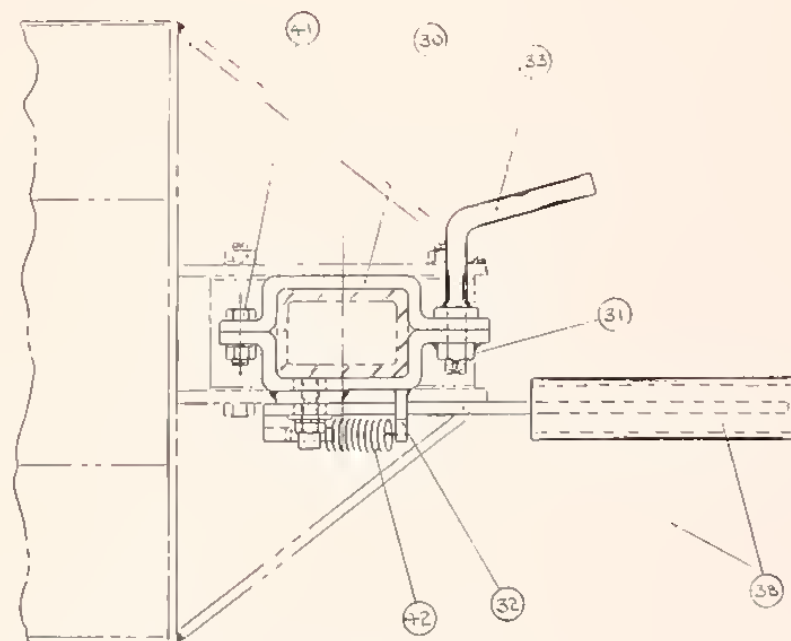


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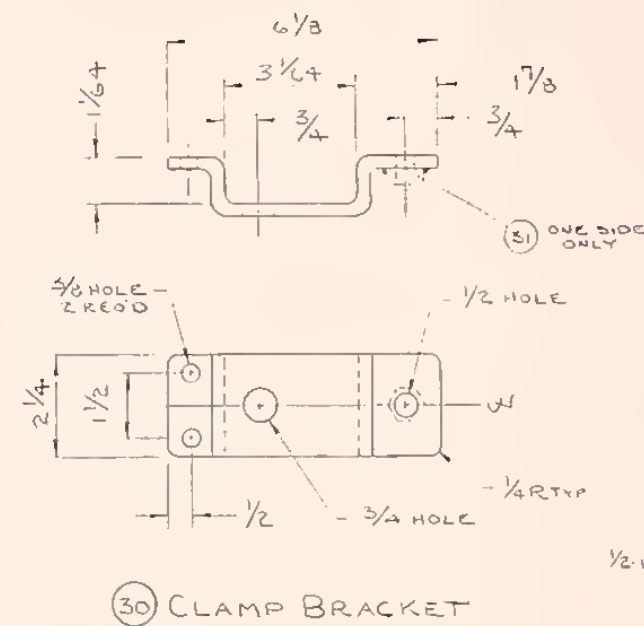
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B

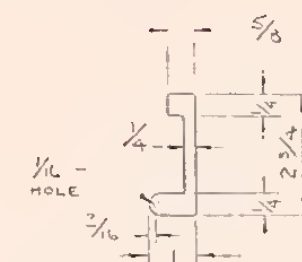
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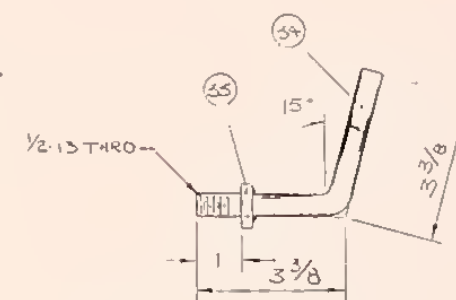
(29) LATCH ASSEMBLY



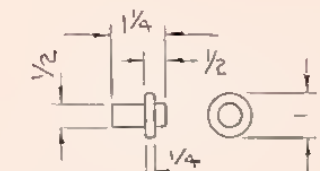
(30) CLAMP BRACKET



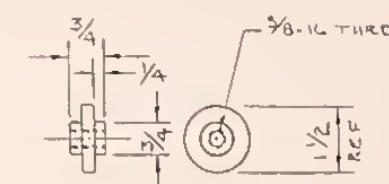
(32) LATCH STOP



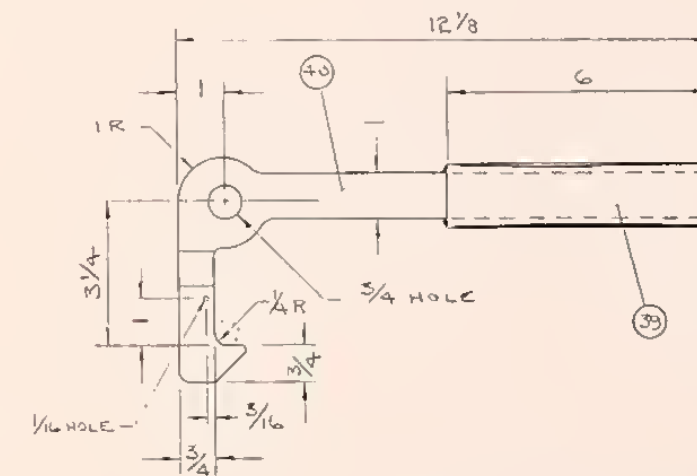
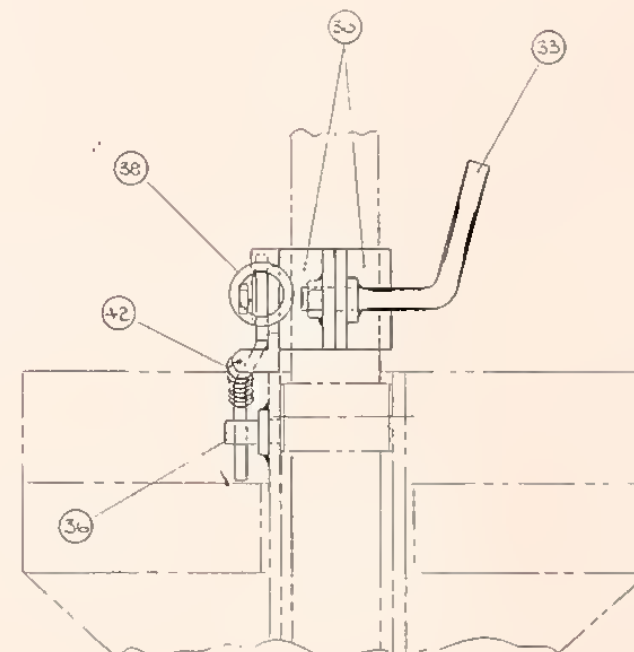
(33) LOCK HANDLE



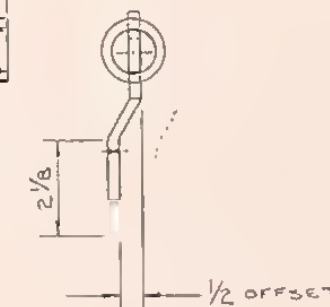
(36) LATCH PIN



(37) HANDLE BUSHING



(38) LATCH HANDLE



MATERIALS LIST				
NO	PART NAME	REQD	MATERIAL DESCRIPTION	SHEET
29	LATCH ASSY	1	PARTS 30-43	
30	CLAMP BRKT	2	1/2 PLATE, STL.	
31	" NUT	1	1/2-13 HEX.	
32	LATCH STOP	1	1/4 PLATE, STL.	
33	LOCK HANDLE	1	PARTS 34-38	
34	SHAFT	1	1/2 RD. BAR, C.R. STL.	
35	COLLAR	1	1/2 ID X 1.00 X 1/4 THK. STL.	
36	LATCH PIN	1	1 RD. BAR, C.R. STL.	
37	HANDLE BUSH.	1	1 1/2 " "	
38	LATCH HANDLE	1	PARTS 39-40	
39	SLEEVE	1	1 SCH. 80 O.K. PIPE, STL.	
40	HANDLE	1	1/4 PLATE, STL.	
41	BOLT ASSY	2	5/8-16 X 1 LG. HEX HD W/ NUT & WASH.	
42	SPRING	1	ASSOCIATED SPRING B END 30.049.2000	
			0.4 EQ, 2.00 FREE LGTH, 1/2 Z 103/IN.	
43	BOLT ASSY	1	3/8-16 X 1 LG. HEX HD W/ LOCK & FLAT WASH	

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UNLESS OTHERWISE SPECIFIED		DATE	REVISION	BY
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DECIMALS ±				
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DIMENSIONS ARE IN INCHES		TITLE		
DRAWN WHWYATT		BEAR IMPACT TESTER		
DESIGNED		LATCH ASSEMBLY		
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